

HEND ABDELKADER: The role of vimentin in lymphangiogenesis using 3D and chorioallantoic membrane systems

Vimentin is a type III intermediate filament protein that is expressed in a variety of cell types with mesenchymal origin. Vimentin has been reported as a marker of epithelial-mesenchymal transition (EMT), and is involved in cancer invasion and metastasis. Vimentin is known to regulate cell adhesion, endothelial sprouting and the formation of new blood vessels. A few recent reports have investigated the role of vimentin in angiogenesis. However, the underlying mechanisms of vimentin's fundamental role in lymphangiogenesis still remain not clear. This study aims at developing two models (*in vitro* three dimensional (3D) /*in vivo* chorioallantoic membrane (CAM) systems to understand the role of vimentin in lymphoangiogenic responses. To achieve this goal, we reduce the expression levels of vimentin protein in lymphatic endothelial cells (LEC) by transfecting shRNA and CRISPR/dCas9 constructs targeting human vimentin into the cells and monitor the influences of vimentin expression in lymphangiogenic sprouting in a 3D environment and in the CAM system. Results suggest that inhibition of vimentin expression significantly reduced 3D sprouting responses of LEC cells and therefore targeting vimentin might be a useful therapeutic strategy to restrict the lymphangiogenic process during cancer metastasis and progression. Furthermore, the constructs and the model systems established in this study can be used for future investigations of vimentin protein in other research aspects.

KEYWORDS: Vimentin, Lymphangiogenesis, 3D assay, CAM system